

Please amend as requested the improper Markush groups in the following claims:

- Claim 1, page 29, lines 9-12.
- The following claims: 7, 8, 9, 10.

The Examiner cited also claim 6 for improper Markush groups.

We are however of the opinion that claim 6 is not open to said objection.

The Examiner cited also Claims 11 and 12.

We remark that said claims do not recite any Markush group.

Rejection of claim 13 under 35 USC § 101 (page 3 of the O.A.)

Please amend said claim to recite as it follows:

"A method for preparing polymeric foams having thermoinsulating properties, where the compositions of fluids of claim 1 are used."

Please add the following new claim, depending on claim 13:

"The method of claim 13, wherein the polymeric foams are polyurethane foams".

Rejection of claims 1-13 under 35 USC § 103

Before commenting the Examiner's objections under said issue, the Applicant wishes to state the gist of the present invention.

It is known in the prior art to obtain stiff polyurethanes foams having a closed cell structure with high thermoinsulating performances by using HFC 141b-based formulations.

For said purpose also cheaper but flammable foaming agents are used, as for example pentanes. Said compounds have however the drawback to show worsened performances in the confront of HFC 141b.

It is also known to use HFC 365mfc as a drop in substitute of HFC 141b. However the thermoinsulating properties of the thus obtained polymeric foams are not satisfactory.

The technical problem of the present invention, see page 4, lines 17-22 of the Application, was to have available mixtures comprising HFC 365mfc, to be used in substitution of HFC 141b, to obtain polymeric foams having improved properties as regards the substantial maintenance in time of the thermoinsulating properties, in particular thermal conductivity.

Said technical problem has been solved according to claim 1, by using a mixture of HFC 365mfc and of the hydrofluoroethers of formula (I) having boiling points from 50°C to 150°C.

The following comments are made on the examples of the present invention.

Examples 2-6 (page 18 of the Spec.) refer to polyurethane foams obtained with the fluid compositions according to the present invention. By using the SEM method to determine cell size (said method is described on page 17, lines 1-9 of the Specification) it was found that the cell sizes of the polyurethane foams according to the present invention are substantially the same than those foams obtained by using HFC 365mfc alone.

Therefore the hydrofluoroethers of formula (I), as stated on page 13, line 15 of the Spec., do not act or as foaming agents or as cell size modifiers. They are chemically inert compounds (page 13, line 14 of the Spec.) in the foam preparation process.

Example 7 comparative on page 19 of the Spec. describes an experiment wherein, in the conditions wherein by using HFC 365mfc foams are obtained, an attempt was made to prepare polyurethane foams by using the hydrofluoroethers of formula (I).

No foams were obtained.

This shows that the hydrofluoroethers having boiling points from 50°C to 150°C are not foaming agents when used to prepare foams in admixture with HFC 365mfc.

Example 8 comparative on page 20 shows that the fluid mixtures according to claim 1 are not azeotropic mixtures.

Example 9 comparative on page 20 shows that by using hydrofluoroethers with a boiling point higher than 150°C a non homogeneous foam is obtained.

To the above comments on the examples of the invention we add that, as stated in the description at page 14, lines 12-16, by using in the fluid mixtures of claim 1 hydrofluoroethers having boiling points from 30°C to 40°C, thereof obtained polyurethane foams do not maintain in time the thermoinsulating properties.

The above therefore shows that it is the combination of HFC 365mfc with hydrofluoroethers of formula (I) having boiling points of from 50°C to 150°C that affords to solve the technical problem of the present invention.

Rejection of claims 1-13 under 35 USC § 103 (pages 4-5 of the O.A.)

The Examiner has rejected the pending claims in view of the following prior art combinations:

- On the basis of Kruecke et al. (USP 6,080,799) in view of Moore et al. (USP 5,658,962) (ref. page 4 of the O.A.).
- On the basis of Kruecke et al. (USP 6,080,799) in view of Klug et al. (USP 5,605,882) (ref. page 5 of the O.A.).

The rejection on the basis of Kruecke et al. (USP 6,080,799) in view of Moore et al. (USP 5,651,962)

#### Kruecke

Kruecke discloses mixtures, see col. 1, lines 54-60, consisting of:

- 50 to 99% by w. of HFC 365mfc;
- 1-50% by w. of at least one fluorinated hydrocarbon selected from the group consisting of:
  - 1, 1, 1, 2 tetrafluoroethane (R 134a);
  - 1, 1, 1, 3, 3 pentafluoroethane;
  - 1, 1, 1, 3, 3, 3 hexafluoroethane;
  - 1, 1, 1, 2, 3, 3, 3 heptafluoroethane (R 227ea).

In the background of USP 799 it is stated that the above selected fluorinated hydrocarbons are known in the art as blowing agents. See col. 1, lines 32-36.

At col 3, lines 44-49 and in claim 15 of Kruecke it is stated that the mixtures according to USP '799 are blowing agents.

The technical problem of the USP, see col. 1, lines 44-51, was to provide a method to manufacture foamed plastics with simpler processing, and besides to make available compositions which do not have a flash point and with which foamed polymer plastics with advantageous properties could be produced in a simpler manner.

Examples 1 and 2 in col. 4 shows that by admixing HFC 365mfc with R 134a (ex. 1) or with 227ea (ex. 2) mixtures have one boiling point that is, respectively, of 20°C (col. 4 line 39) and 23°C (col. 4 line 46) are obtained.

#### Comments on Kruecke

We remark that in view of Kruecke the skilled would not be motivated to use a hydrofluoroether in place of the selected fluorinated hydrocarbons therein mentioned. In fact there is no suggestion in USP '799 to make said substitution.

Besides, we remark that Kruecke teaches binary compositions wherein both components are blowing agents.

Further, as commented herein above, in examples 1 and 2 the reference teaches binary compositions having one boiling point.

This would suggest the skilled to think of azeotropic compositions.

Therefore the skilled is suggested from Kruecke to use in admixture with HFC 365mfc a compound that should be a blowing agent and that could form an azeotrope, as from exs. 1-2.

We conclude that Kruecke teaches away from the solution found in the present invention to the technical problem of having available mixtures comprising HFC 365mfc, to be used in substitution of HFC 141b, for obtaining polymeric foams having improved properties as regards the substantial maintenance in time of the thermoinsulating properties.

Moore

Moore discloses omega-hydrofluoroethers, their preparation and their applications.

At col. 13 of the USP '962 it is stated that omega-hydrofluoroether compositions are useful for cleaning and drying applications (ref. col. 13 line: 38-40), as heat transfer agents or coolants, blowing agents, cell size regulators in making polyurethane foam insulation, or chemical fire extinguishing agents or as lubricants for magnetic recording media (ref. col. 13 lines 45-52).

We remind again that according to the present invention only a selected class of the hydrofluoroethers of formula (I), i.e. those giving boiling points from 50°C to 150°C, are suitable for the combination with HFC 365mfc in order to solve the technical problem of the present invention.

Instead, Moore teaches also hydrofluoroethers having boiling points as high as 178-183°C, as in example 29 col. 23, line 65, or as low as 40°C as in example 1, col. 14 line 66.

Therefore even if, by hypothesis, from Kruecke the skilled would have drawn the teaching of combining hydrofluoroethers with HFC 365mfc, in view of Moore he could not be able to select those hydrofluoroethers that could be used to solve the technical problem of the present invention.

The rejection on the basis of Kruecke et al. (USP 6,080,799) in view of Klug et al. (USP 5,605,882)

Kruecke has been commented herein above already.

Klug

Klug has been commented already in the Application.

In brief, Klug disclosed with azeotropic mixtures of hydrofluorocarbons and hydrofluoroethers.

We remark that, differently from Klug, in the Application in re the fluid mixtures are instead non azeotropic. See example 8 comparative.

Therefore, considering Kruecke in view of Klug, even not considering that Kruecke does not mention hydrofluoroethers, the skilled would not be motivated to select non-azeotropic fluid mixtures comprising HFC 365mfc.

Further, we wish to remark herein that also Klug, as

formerly outlined for Moore, is silent as to those hydrofluoroethers that in combination with HFC 365mfc allow to solve the technical problem of the present invention.

Therefore the combination of Kruecke in view of Klug, as formerly that of Kruecke with Moore, fails to suggest to the skilled the solution found in the present invention.

Other prior art cited by the Examiner (page 5, bottom of the O.A.)

About the other prior art cited by the Examiner we remark the following.

USP 3,342,875 (Selman)

It discloses fluorocarbon polyethers capped with hydrogen (col. 1, lines 11-13). The technical problem of said patent was to improve the chemical stability of said polyethers. See col. 2, lines 28-31.

Therefore it has nothing to do with the present invention.

USP 5,297,808 (Doerge)

It discloses specific combinations of HFC 141b with perfluorinated compounds by which the insulating capacity of isocyanate-based foams is improved as compared with foams made without all the above said ingredients (col. 1, lines 52-56).

Therefore this patent is not relevant.

USP 5,684,056 (Stevenson)

It discloses a blowing agent composition comprising a mixture having a major portion of HFC 123 and a minor portion of HFC 141b (col. 2, lines 38-40). Said mixture is for polyisocyanate-based and polyurethane based foams and allows to prepare stronger foams with a reduced cell size, better insulating properties and dimensional stability (col. 2, lines 29-32).

Therefore also this patent is not relevant.

USP 6,423,673 (Owens)

It discloses azeotropic compositions of HFC 365mfc with a fluorinated ketone of formula  $R_fC(O)CF(CF_3)_2$ , wherein  $R_f$  is  $CF_3CF_2-$ ,  $CF_3CF_2CF_2-$  or  $(CF_3)_2CF-$ . See the abstract.

Therefore also this patent has nothing to do with the present invention.

USP 6,214,253 (Moore)

The patent is a division application of USP 5,658,962.

It appears that the specification is substantially the same as that of the former patent.

Therefore the same comment; as for USP '962 can be repeated.  
US 20010027172 (Moore)

The patent application appears to have substantially the same specification of USP 5,651,962.

Therefore the same comment; as for USP '962 can be repeated.

Yours very truly

SAMA PATENTS

(Daniele Sama)

